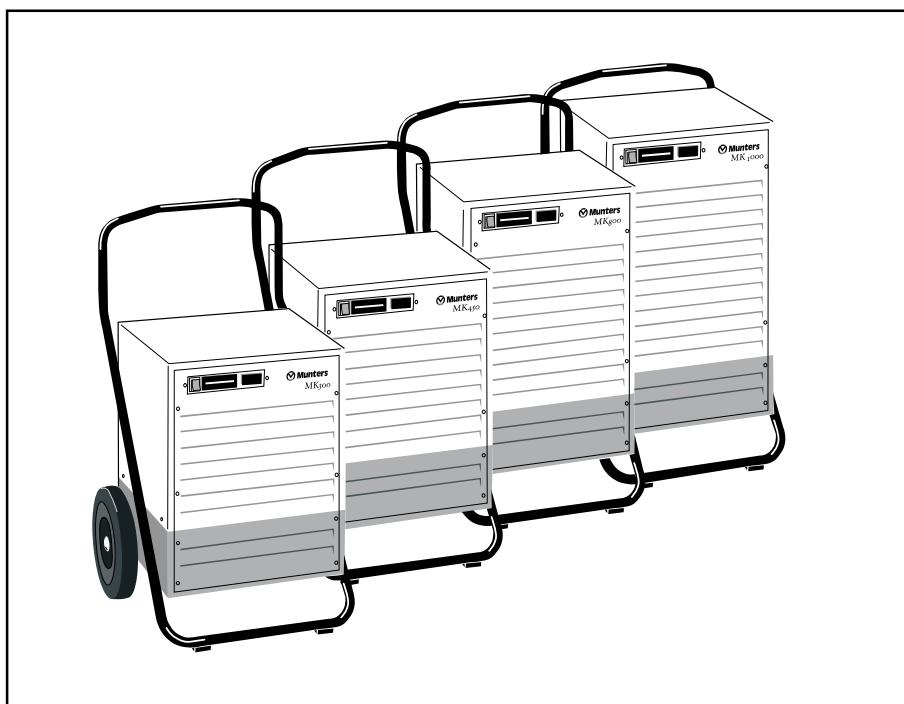


# User's manual

# MK



## Cooling Dehumidifier MK-series

Effective from serial No. 227789 990319



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## Important user information

### Intended use of equipment

The MK-series cooling dehumidifiers are to be used for dehumidification of air. All other use of the equipment, or use which is contrary to the instructions given in this manual, can cause personal injury and/or machine damage.

### About this manual

This manual describes the preparation for operation, maintenance and fault finding.

The goal of the manual is to provide the necessary information for the understanding of the unit's construction and function, and to serve as a guide during installation operation, maintenance and basic trouble shooting.

### Warranty and obligations

The warranty period is 12 months from the date the equipment left our factory unless otherwise advised in writing. The warranty is limited to a free exchange complete with free freight, of faulty units or components which have failed as a result of faulty quality or defects in manufacture.

Munters guarantees that the delivered unit has undergone rigid testing to ensure that the specifications stated here are fulfilled. All claims on warranty must verify that the fault has occurred within the guarantee period, plus that the unit has been used within its operating range as stated in the specification. All claims must include the unit type and manufacturing number. This data is to be found stamped on the unit identification plate, see section 1.5 Marking for location.

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### Safety



**WARNING!** is used in this publication to indicate a possible danger that could lead to personal injury. An instruction is normally given, followed by a short explanation plus the possible effect if the instruction is not followed.



**CAUTION!** is used in this publication to indicate a possible danger that could lead to damage to the machine or other equipment and/or cause environmental damage. An instruction is normally given, followed by a short explanation plus the possible environmental effect if the instruction is not followed.

### NOTE!

is used to accentuate supplementary information that is required for problem-free use or optimal use of the unit.

### Conformity with directives and standards

MK-series is designed and manufactured by an EN-ISO 9001 accredited development and manufacturing organisation. The units conform with the specifications in European machine directive 89/392/EEC, the low voltage directive 73/23/EEC and EMC directive 89/336/EEC. The following design standards have been applied:

- EN 292-1/-2 - Machine safety, basic concepts, general principles for design.
- EN 60335-2-40 - Machine safety, electrical equipment of machines.
- EN 1050 - Machine safety, risk analysis.
- EN 50081-1 - Electromagnetic compatibility, general emission standard, public environment.
- EN 50082-2 - Electromagnetic compatibility, general resistance standard industrial environment.

# 1. Introduction

## 1.1 General

The Munters MK-series dehumidifiers are available in four (4) different sizes and they can easily be moved to locations where dehumidification of air is required.


## 1.2 Unpacking of the unit

The MK 300 has to be lifted vertically out of the packaging if you do not want to damage the packaging. The MK 450, MK 800 and MK 1000 can be rolled out after having tilted the packaging.


After the handle is fitted the unit is ready to use.

## 1.3 Method of operation

The dehumidifiers type MK work in accordance with the condensation principle.

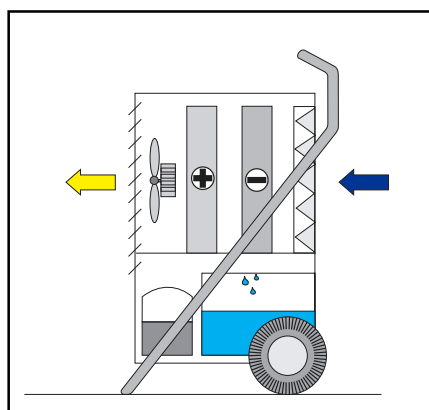
*Figure 1-1* shows the principle in the cooling circuit. The humid air is drawn in by a fan. The air passes through a filter and is cooled down on the evaporator . This will bring the air temperature down below the dew point and then the water vapour condenses to droplets on the evaporator.

The droplets fall onto a condensate tray and are led to a water container (MK300, MK450, MK800) or to a drain (MK1000).

The cold air is then led through the condenser  where it is reheated. This heat comes from the condensation process and from the energy of the compressor and the fan, which is turned into heat. Therefore the air leaves the dehumidifier at a temperature which is higher than at the entrance.

The approx. increase in temperature is 5°C.

The continuous air circulation through the unit reduces the relative humidity giving rapid but gentle drying.



*Figure 1-1 Principle of the cooling process*

## 1.4 Transport instructions

The MK 300 has to be transported in vertical position. If the unit is laid down during transport, the compressor may be damaged, and oil from the compressor may get into the cooling circuit.

These precepts do not apply for MK 450, MK 800 and MK 1000, as these units are fitted with rotary compressors.

## 1.5 Safety

Information given in this manual are suggested best working practice and shall in no way take precedence over individual responsibilities and/or local rules and regulations.

Great effort has been placed on the design and manufacture of the various sections of the unit so that it will comply with all applicable safety aspects for this type of equipment. During operation it is always each individual person's responsibility to consider:

- Their own and others' personal safety.
- The safety of the unit through correct use of the equipment in accordance with the descriptions and instructions given in this manual.



**WARNING!** The dehumidifier must be connected to an earthed electrical outlet.



**WARNING!** The dehumidifier must not be connected to other mains than specified on the unit's identification plate.



**WARNING!** The dehumidifier must not be opened by anyone other than trained and qualified personnel.

## 1.6 Marking

### 1.6.1 Location

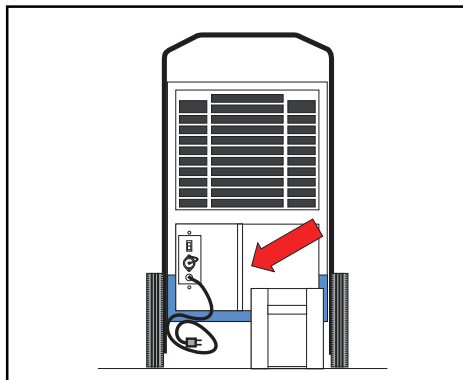


Figure 1-2. Identification plate location

### 1.6.2 Identification plate

Typ Type	MK0000	Einsatzbereich Temperatur Working range temperature	3 - 30	°C
Seriennummer Serial no.	0000000000	Baujahr Model	Einsatzbereich Feuchte Working range humidity	40 - 100 %
Luftvolumenstrom Air circulation	0000	m <sup>3</sup> /h	Einsatzbereich Spannung Working range power supply	200-240 V
Kältemittel Refrigerant	R 407C	Spannung Power supply	230/50	V/Hz
Flüssigkeit Charging quantity	0,0000	kg	Max Stromaufnahme Max current consumption	0,0 A
Max. Betriebsdruck Max. high pressure	24	bar	Max. Leistungsaufnahme Max. power consumption	0,0 kW
<div> <div> Munters GmbH Hans Düncker Strasse 14 D 21035 Hamburg Telefon +49 (0)40 7 3416-01 Telefax +49 (0)40 7 3416-131 </div> <div> Munters Europe AB Kung Hans Väg 8 S-191 24 Sollentuna Telefon +46 (0)8 626 63 63 Telefax +46 (0)8 626 63 65 </div> </div>				

Figure 1-3. Identification plate content

## 2. Installation

### 2.1 General

The MK Dehumidifiers are intended for indoor installation.

If the unit is stored prior to installation, place it in a roofed area, on a level surface where it is protected from impact, dust, frost, rain or aggressive contaminants.

### 2.2 Placing of the unit

If possible the dehumidifier should be placed in the middle of a room to ensure a good air circulation.

The air should be sucked in freely at the back of the unit and blown out at the front.

It is important that the dehumidifier is not installed near a source of heat as for example a radiator, and doors and windows must be kept closed.

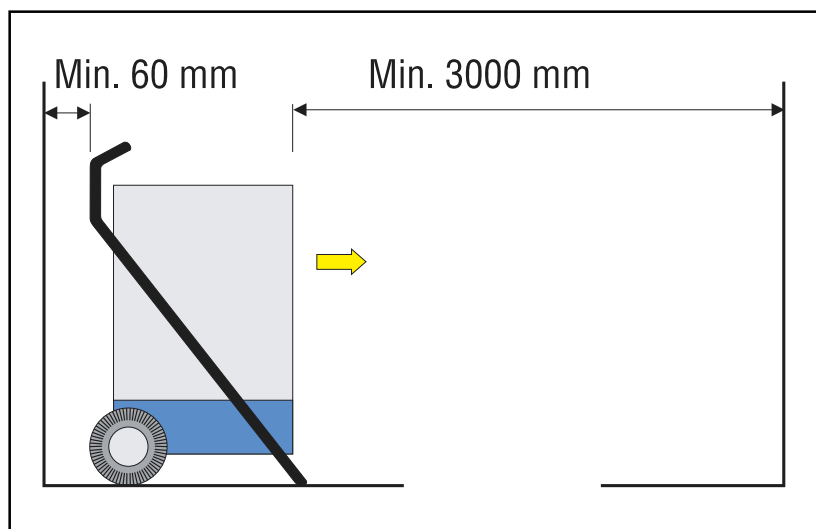


Figure 2-1. Minimum distances to walls

### 2.3 Electrical connection

#### 2.3.1 General

The unit is complete with plug and power cable for connection to an earthed outlet. The voltage and frequency are specified on the unit's identification plate.

#### 2.3.2 Safety



**WARNING!** The dehumidifier must be connected to an earthed electrical outlet.



**WARNING!** The dehumidifier must not be connected to other mains than specified on the unit's identification plate.



**WARNING!** The dehumidifier must not be opened by anyone other than trained and qualified personnel.

## 2.4 Condensate drain

The condensate discharge into the water container included for the units MK300, MK450 and MK800. The dehumidifier is stopped automatically when the water container is full. Switch the on-off switch to off position before emptying the water container. The MK 1000 has no water container and therefore a hose (Ø 16 mm) must be connected to the drain outlet.

## 2.5 Connection of humidistat

### 2.5.1 General

The connection socket for the humidistat is located at the power cable entry. Appropriate plug for the humidistat socket can be ordered from Munters, see section 2.5.2 *Humidistat connection kit*

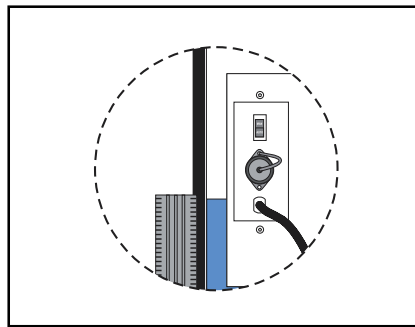


Figure 2-2 Power cable entry, Humidistat socket and Man/Auto mode switch

The humidistat shall be mounted 1–1.5 m. above the floor and positioned so that it is not exposed directly to dry air from the unit or incoming moist air from opening and closing doors. It may not be placed close to a heat source or so that it is exposed to direct sunlight.

The humidistat shall be a single stage humidistat and connected so that the controlling circuit closes as relative humidity increases. The connecting cable shall be screened and have copper conductors with a minimum cross-section area of  $2 \times 0.75 \text{ mm}^2$ .

### 2.5.2 Humidistat connection kit

Follow the instructions below to assembly and connect the humidistat connection kit. (Art. No. 24039E)

1. Connect the leads to pins 1 and 2, and the screen to the earth pin.
2. Affix the terminal (2) to the plug (1).
3. Tighten the terminal screws (3).
4. Affix the cover (4) to the plug (1).
5. Affix the flange (5) to the cover (4).

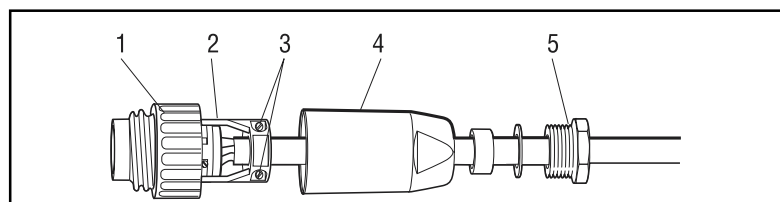


Figure 2-3 Humidistat connection kit assembly



## 3. Operation

### 3.1 General

The control panel on the front of the dehumidifier consists of on-off switch, display and hour run meter. A mode switch is located at the back of the dehumidifier, see *Figure 2-2*

The dehumidifier has two operating modes :

**Man** Operation without humidistat.

**Auto** Operation with humidistat

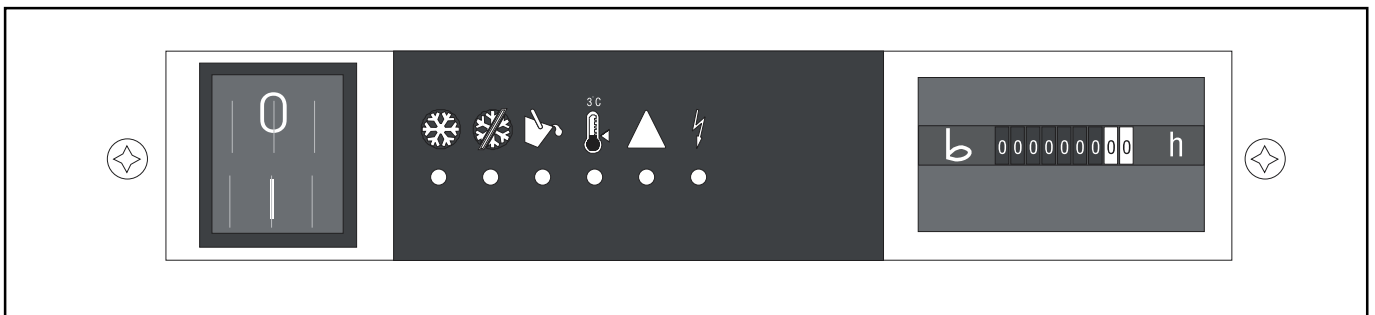
**NOTE!** For the dehumidifier to function in Auto mode, a single stage humidistat must be connected to the unit. See Section 2.5, Connection of humidistat.

**NOTE!** After each stop of the unit, in Man mode or in Auto mode or due to the water stop function, there is a built-in function that delays re-start of the dehumidifier for 45 seconds. This will protect the compressor against frequent starts and stops.

### 3.2 Emergency stops

Stop the unit with the on-off switch at the front of the unit, see *Figure 3-1*, or pull out the plug from the wall outlet.







### 3.3 Start



*Figure 3-1. Control panel - on-off switch, display and hour run meter*

#### 3.3.1 Measured values

The following parameter information are displayed and the light diodes (LED) give the following indications:

- |   |   |
|---|---|
|  | 1. The unit is on and the compressor is running.  |
|  | 2. The temperature/pressure on the condenser side is too high. The unit is switched off for 45 minutes before automatic restart. The LED is on and indicates a failure.           |
|  | 3. The temperature in the room is too low. At temperatures under +3°C the unit stops. If the ambient temperature increases to more than +3°C the unit starts again automatically. |
|  | 4. The unit is switched off because the water container is full.  |
|  | 5. The unit is in defrosting mode. During defrosting the compressor is working and the fan is stopped.  |
|  | 6. The evaporator is icing up.  |

### 3.3.2 Manual operation

1. Switch the on-off switch to position **I**, see *Figure 3-1*.
2. Select the **MAN** operating mode with the MAN-AUTO switch, see *Figure 2-2*.

Fan and compressor start. The light diode No. 1 on the display lights up. The unit now operates continuously, independently of the relative humidity in the room. The unit is switched off by turning the on-off switch to position **0**.

### 3.3.3 Automatic operation

For the dehumidifier to operate in the **Auto** mode, the humidistat must be connected to the humidistat socket of the unit, see *Section 2.5, Connection of humidistat*.

1. Adjust the humidistat to the desired setpoint.
2. Switch the on-off switch to position **I**, see *Figure 3-1*.
3. Select the **Auto** operating mode with the MAN-AUTO switch, see *Figure 2-2*.

If the relative humidity of the room is higher than the humidistat setpoint, the unit starts to dehumidify. When the relative humidity of the air is equal to the setpoint of the humidistat, the unit switches off automatically. If the humidity of the air increases again, the unit is switched on again by the humidistat.

If the dehumidifier is to be turned off completely, for example if the water container is to be emptied, the on-off switch must be set at position **0**.

#### NOTE!

*The opening and closing of the humidistat circuit within the 45 seconds period will not start the dehumidifier again because of the delay function. The purpose with this function is to prevent the dehumidifier from continuously cycling on and off, in the event the humidistat is installed in a poorly chosen location.*

### 3.3.4 Hour run meter

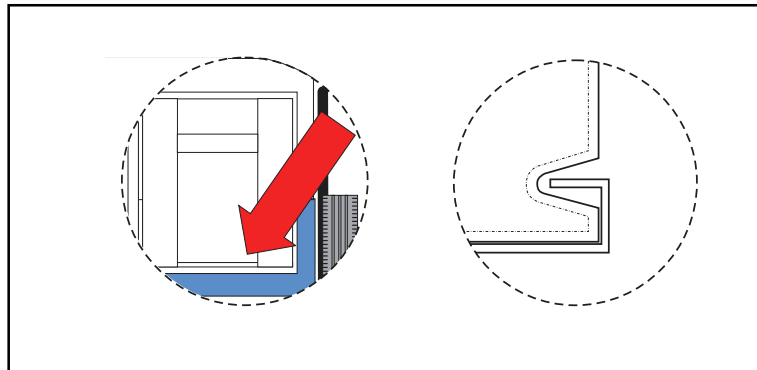
The hour run meter indicates accumulated number of hours the dehumidifier has been in dehumidifying operation. The two digits to the right indicate percent of one hour e.g. 0000475 should be read as four hours and 45 minutes. The hour run meter is not re-settable.

## 3.4 Stop

Switch the on-off switch to position **0**, see *Figure 3-1*.

### 3.5 Emptying the water container

As mentioned in section 2.4 the unit has to be switched off before taking out the water container. When taking out the water container, press it slightly inwards to disengage the cut of the water container from the edge. When reinserting the water container care must be taken not to place the container in a position which switches off the automatic water stop function, see *Figure 3-2*.



*Figure 3-2. Position of the water container*

**NOTE!** *If the water stop function is switched off the water in the container will run over.*

**NOTE!** *After each stop of the unit by the water stop function, here is a built-in function that delays re-start of the dehumidifier for 45 seconds.*

## 4. Maintenance

### 4.1 General

The dehumidifier is designed for long, continuous operation with a minimum of attendance. Under normal operating conditions, requirements for maintenance are minimal.

Maintenance interval lengths are primarily determined by operating conditions and the environment in which the unit is installed. When in doubt, consult Munters' product service department. See addresses for Munters representatives on the back cover of this manual.

### 4.2 Safety



**WARNING!** *The unit must not be opened by anyone other than trained and qualified personnel.*

### 4.3 Maintenance schedule

The unit design allows for required maintenance actions to be carried out from the outside without the need for opening the unit.

The following maintenance schedule is recommended by Munters and covers procedures for inspection and maintenance as well as suggested time intervals for a unit that operates under normal operational and environmental conditions.

If the inlet process air has a high dust content, preventative scheduled maintenance should be performed at shorter intervals than what is specified below.

Component	Inspection/maintenance	
	3-6 months	12 months
Process filter <sup>1</sup>	Clean filter. It can be rinsed in lukewarm soapy water or, if not very dirty, cleaned with a vacuum cleaner.	Clean filter housing and change filter (EU3).
Dehumidifier, outside	Check for physical damage and clean unit exterior if necessary.	Check for physical damage and clean unit exterior if necessary. Contact Munters' product service department as required.
Humidistat	-	Check sensor functions and calibrate if necessary. Contact Munters' product service department as required.

1) Filter mesh is removed by moving the upper part outwards.

Table 4-1. Maintenance schedule

## 5. Fault finding

### 5.1 General

The purpose of this chapter is to provide guidance in basic fault finding and provide instructions for corrective actions so as to remedy faults.

### 5.2 Safety



**WARNING!** *The unit must not be connected to other mains than specified on the units identification plate.*



**WARNING!** *The unit must not be opened by anyone other than trained and qualified personnel.*

### 5.3 Fault localization

The unit design allows for fault localization actions to be carried out from the outside without the need for opening the unit.

Go through the following trouble shooting list before contacting Munters' product service department. The list provides help in identifying types of faults that are easy to remedy without the assistance of specially trained personnel.

Fault symptom	Possible cause	Corrective action
Dehumidifier has stopped and no fault indications are light up.	On-off switch turned off by mistake.  No mains power to unit.  Dehumidifier switched to automatic mode by mistake with no humidistat connected.  Dehumidifier switched to manual mode by mistake with a humidistat connected.  Humidistat setpoint too high  Humidistat fault (automatic mode).	Place the on-off switch in the on position and check that dehumidifier starts.  Check mains power to unit.  Set the operating mode switch to manual mode and check that the dehumidifier starts.  Set the operating mode switch to automatic mode and check that the dehumidifier starts.  Reduce humidistat setpoint  Set the operating mode to manual mode and check that the dehumidifier starts. If the unit starts, the humidistat is probably at fault.  Check the humidistat by seeing if the dehumidifier starts when the humidistat setpoint is reduced. Reset the humidistat setpoint after the check. Calibrate the humidistat if necessary.
Dehumidifier has stopped and fault indication No 2. lights up	Roomtemperature is above +30°C  Pressure and temperature on the high-pressure side of the cooling system is too high.	Wait until the room temperature is below +30°C  Check filter and process air inlet for dirt or blockage. Check that the fan is working. Contact Munters product service.
Dehumidifier has stopped and fault indication No 3. lights up	Room temperature is below +3°C.	Wait until the temperature is above +3°C
Dehumidifier has stopped and fault indication No 4. lights up	The water container is full.	Empty the water container.
Dehumidifier capacity has diminished	Fault in the cooling circuit.	Contact Munters product service.

*Table 5-1. Fault localization*

## 6. Technical Data

### 6.1 Technical specification

Model	Type	MK300	MK450	MK800	MK1000
Working range - humidity	% R.H.	40 - 100	40 - 100	40 - 100	40 - 100
Working range - temperature	°C	3 - 30	3 - 30	3 - 30	3 - 30
Power supply	V/Hz	230/50	230/50	230/50	230/50
Max. current consumption	A	2,7	2,9	4,1	6,9
Max. power consumption	W	600	700	950	1500
Air flow	m³/h	280	400	800	1000
Refrigerant	-	R 407C	R 407C	R 407C	R 407C
Refrigerant quantity	kg	0,3	0,475	0,575	1,6
Capacity of water container	l	5,5	12,5	12,5	- *)
Weight	kg	41	52	60	74
Dimensions Width including frame Depth handle and wheels Height	mm mm mm	486 546 991	596 580 1010	596 580 1010	686 607 1128
Max. noise level	dBA	58	60	62	65
Dehumidification capacity at 20°C 60% RH at 10°C 60% RH	l/24h l/24h	7,7 3,0	18,0 7,2	28,8 11,5	36,0 15,6

\*) Hose to be connected to drain outlet

Table 6-1. Specifications



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